UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NATIONAL VEHICLE AND FUEL EMISSIONS LABORATORY
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ANN ARBOR, MICHIGAN 48105-2498

OFFICE OF
AIR AND RADIATION

Aug 29, 2002 CCD-02-12 (LDV/LDT/MDV/HD)

SUBJECT: Certification Guidance for Alternative Fuel Converters

Dear Manufacturer:

This letter and attachments provide information for small volume manufacturers who convert vehicles and engines to operate on gaseous alternative fuels, such as compressed natural gas (CNG) and liquified petroleum gas (LPG), on a dedicated or dual fuel basis. It also provides clarification to original equipment manufacturers (OEMs) who are certifying CNG and LPG vehicles.

Background

Effective April 1, 2002 EPA policy directs all aftermarket manufacturers[1] to obtain certification to be protected from charges of tampering. Previously, EPA allowed aftermarket converters to comply with emission standards by modifying the vehicle or engine, conducting chassis or engine dynamometer exhaust test for emission compliance, and maintaining all records related to the conversion. That method of ensuring compliance with emission standards was known as Option 3 of Memorandum 1A. Option 3, an interim option, was established to provide aftermarket manufacturers time to transition toward full certification.

On February 13, 2002 EPA hosted a workshop at its Ann Arbor office facility. At that time, a more efficient process for obtaining a certificate of conformity was presented. This workshop was held principally for the benefit of aftermarket converters who were new to the EPA certification process. Two draft documents, "Alternative Fuels Converters Workshop, Feb 13, 2002 - Potential Questions," and "Test Requirements for Alternative Fuels Converters," were distributed and discussed at the workshop. The attachments to this letter provide a revised and expanded list of questions and answers and a revised document highlighting the testing requirements for aftermarket alternative fuels converters.

Principal changes to the February 13 draft documents

- At the workshop it was announced that questions related to standards and warranty provisions were not provided in writing because they needed further review by EPA's staff. The attached updated list of questions and answers provides written guidance on these topics.

[1] In this letter a small volume manufacturer is defined as an individual or company who installs a fuel conversion system to a vehicle or engine which has been sold to the ultimate purchaser and placed in service allowing the vehicle or engine to operate on a fuel other than the fuel which the vehicle or engine was originally certified to use. This is also consistent with the definition of aftermarket conversion installer in 40 CFR 85.502. In this letter and attachments the terms aftermarket manufacturer and converter are often used interchangeably.

- The test requirements document has been modified to highlight flexibility in the evaporative emission reporting requirements for aftermarket manufacturers of alternative fueled vehicles. On a case by case basis, aftermarket converters may obtain waivers for evaporative emission testing, as provided in the September 21, 1994 Federal Register final rule[2] addressing standards for natural gas fueled vehicles (NGVs), and liquified petroleum gas fueled vehicles (LPGs). The requirements for obtaining waivers from evaporative emission testing are described in Attachment 2, Test Requirements for Alternative Fuels Converters. Aftermarket manufacturers not seeking waivers must submit official data demonstrating compliance with the applicable evaporative and refueling standards.

Clarification of OEM responsibilities regarding Certifying CNG and LPG vehicles

Conventional small and large volume manufacturers of dedicated and dual fuel vehicles which operate on CNG or LPG may also take advantage of the testing waivers for evaporative emission testing with CNG or LPG fuels. OEM-produced alternative fuel vehicles have different data reporting and fee payment requirements than aftermarket converters due to their fuel economy labeling and CAFE responsibilities, and therefore they may not take advantage of the reduced fee schedule and spreadsheet data entry option. OEMs may exercise good engineering judgement in selecting durability factors to apply to exhaust and evaporative emissions from results obtained using alternative fuels. This may include using deterioration factors carried over from previously certified durability groups operating on conventional fuels.

If you have questions concerning this letter or the attachments, please contact Martin Reineman at 734-214-4430, or by e-mail at reineman.martin@epa.gov.

Sincerely,

Gregory A. Green, Director
Certification and Compliance Division
Office of Transportation and Air Quality

Attachments (2)

[2]Standards for Emissions From Natural Gas-Fueled, and Liquified Petroleum Gas-Fueled Motor Vehicles and Motor Vehicle Engines, and Certification Procedures for Aftermarket Conversions, 59 FR 48472, September 21,1994, Final Rule

Attachment 1
Light Duty Vehicle and Light Duty Truck Alternative Fuels Conversions
Questions and Answers

August 29, 2002

The answers to the questions are based on the Standards for Emissions from Natural Gas-Fueled, and Liquified Petroleum Gas-Fueled Motor Vehicles and Motor Vehicle Engines, and Certification Procedures for Aftermarket Conversions, 59 FR 48472, September 21, 1994, Final Rule; 40 CFR Parts 80, 85, 86, 88, 600; and the Clean Air Act as amended. It also references EPA guidance documents and web site locations. In the event that an answer conflicts with an EPA regulation, the regulation takes precedence.

1. *Can you outline the Certification process for an aftermarket conversion to an alternative fuel?*

Ans. See Attachment 1-A, entitled: "Certification and In-Use Requirements for Small Volume Manufacturers of Light Duty Vehicle and Light Duty Truck Alternative Fuel Conversions."

2. *Will EPA establish a "micro-sales volume" class as described in the November 27, 2001 letter from the National Propane Gas Association addressed to Bruce Buckheit of EPA's Air Enforcement Division?*

Ans. No. There is enough flexibility in our current small volume regulations (40 CFR Part 86, Subpart S) to accommodate aftermarket converters of light duty vehicles and trucks to alternative fuels and to meet EPA requirements. There are significant testing and reporting efficiencies which EPA has already developed to lessen the burden of certification. These include reporting changes, use of more representative deterioration factors, flexibility in approving waivers of specific tests, and a reduced fee schedule.

3. *How can I assure that an aftermarket conversion does not constitute tampering?*

Ans. Previously, EPA provided guidance on its enforcement policy regarding the tampering provision under Section 203(a)(3) of the Clean Air Act. Under the guidance, aftermarket manufacturers and installers could modify or convert a vehicle or engine by conducting a chassis or engine dynamometer exhaust test for emissions compliance in order to demonstrate that the modification does not adversely affect emissions performance, and by maintaining all records related to the modification or conversion. That method, known as Option 3 of the Addendum to Memorandum 1A, was an interim option intended to provide aftermarket manufacturers and installers adequate time to transition toward full certification. Effective April 1, 2002, Option 3 is no longer recognized under EPA's enforcement policy.

Under EPA's regulations, it is not tampering if you manufacture, distribute or install an

aftermarket conversion system or kit that is certified in accordance with EPA's regulations. In addition, if you manufacture, distribute or install an aftermarket conversion system or kit certified under the state of California's revised procedures for 1994 and subsequent model years vehicles, EPA, under its enforcement policy, does not intend to consider the modification as tampering.[3]

As a reminder, suppliers and installers of individual replacement parts that have no intention of producing and installing parts for the purpose of a full alternative fuel conversion can protect themselves from charges of tampering by having a reasonable basis to believe that the replacement part is designed to perform the same function with respect to emissions as the original part. Contact EPA for a copy of Mobile Source Enforcement Memorandum No. 1A, dated June 25, 1974.

4. *What vehicle group(s) does the Certificate apply to?*

Ans. Certificates apply to the "test group" listed on the Certificate and described in manufacturer's application for certification. A test group is a basic EPA classification unit and is defined in 40 CFR 86.1803-1. The test group was previously known as the "engine family."

5. *What model year standards apply to converted vehicles?*

Ans. The applicable standards are discussed in 40 CFR 85.504.

Model year (MY) 1993 and newer model year vehicles must meet the standards applicable at the time the vehicle was originally certified by EPA. For example, a 1996 MY vehicle converted to alternative fuel usage in the 2002 calendar year must meet the applicable 1996 MY standards.

MY 1992 and earlier vehicles must meet the Tier 0 standards for hydrocarbon, and the CO, NOx, particulate, and evaporative emission standards applicable at the time the vehicle was originally certified by EPA.

An alternative fuel converter may certify vehicles to a more stringent standard.

6. *Where are EPA light duty vehicle and truck emission standards presented?*

Ans. EPA exhaust and evaporative emission standards for light-duty vehicles and light-duty trucks are found in the regulations at 40 CFR 86.1810-01 through 1815-02. Pre-Tier 2

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[3] EPA and California have different requirements. EPA certification will not meet California requirements. For further information see: Addendum to Mobile Source Enforcement Memorandum 1A: Tampering Enforcement Policy for Alternative Fuel Aftermarket Conversions, dated September 4, 1997 and subsequent revisions, and certification regulations and applicable standards set forth at 40 CFR Parts 85 though 88.

standards are compiled on EPA's web site at www.epa.gov/otaq/stds-ld.htm

7. *What exhaust and evaporative emission tests must be conducted?*

Ans. See Attachment 2, entitled: "Test Requirements for Alternative Fuels Converters."

8. *Low mileage emission data vehicles may not be available. Is there a restriction on the emission data vehicle mileage for aftermarket conversions, and do the assigned deterioration factors (DFs) still apply, regardless of mileage?*

Ans. There are no maximum mileage restrictions on the emission data vehicle. The assigned DFs for compliance with intermediate and full useful life would then be applied to the higher mileage emission data vehicles.
cite: 40 CFR 86.1830-01(c).

9. *The assigned deterioration factors (DFs) for gaseous and clean fuel fleet vehicles presented in EPA guidance letter CCD-00-12, dated August 24, 2000 appear to be high. Are these the only option for assigned DFs for alternative fuels conversions?*

Ans. Flexibility exists under 40 CFR 86.1826-01(b)(1) and (2) to allow aftermarket converters to use OEM's derived DFs which were applied to exhaust and evaporative emission results from tests conducted with the fuel used to obtain the original certificate. This option is also available to small volume manufacturers which currently supply conversions to OEMs. Use of OEM's DFs is contingent on the alternative fuel converter or a supplier of vehicles to OEMs not modifying the components or location of the OEM emission control system or the fuel control system, or increasing the weight of the vehicle by more than 500 pounds. Use of the OEM DFs are available for conversions to dedicated alternative fuels and dual fuel conversions. Aftermarket converters must make a statement that they have not altered the OEM's emission control system, and include this statement in their application for certification. Alternatively, converters may develop their own deterioration factors based on the durability demonstration requirements in 40 CFR Parts 86.1823-01, 86.1824-01, 86.1825-01, and 86.1826-01.

40 CFR Parts 86.1823-01(a)(3), 86.1824-01(a)(2)(v), 86.1826-01(2)(i), and 86.1851-01(a) provide the flexibility for small volume test group manufacturers, and large volume manufactures, to exercise good engineering judgement in applying an appropriate DF to the exhaust and evaporative emission results on the alternative fuel.

10. *What laboratories conduct the EPA tests?*

Ans. A list of laboratories that have the capabilities to conduct some or all of the required exhaust and evaporative emission testing is supplied by and periodically updated by EPA. EPA does not endorse or approve test laboratories, or vouch for the list's completeness. The lab list may be viewed at: www.epa.gov/otaq/consumer/lablist.pdf under Inventors/Devices: Aftermarket Retrofit Device Evaluation Program, Program Overview,

List of independent test labs (May 2001).

11. *Where are test procedures and small volume manufacturer regulations described?*

Ans. Subpart B of 40 CFR Part 86 describes the test procedures for conducting the relevant emission tests. Subpart S of 40 CFR Part 86 describes the provisions for conventional small volume manufacturers. The CFR is available on-line at: http://www.gpo.gov/nara/cfr/index.html This regulation (and other EPA regulations) are available from the EPA web site at: http://www.epa.gov/otaq/ld-hwy.htm#regs Hard copies of 40 CFR Part 86 (two volumes) may be ordered by calling 202-512-1800.

12. *How is fuel economy calculated from gasoline, diesel, CNG, or LPG fueled vehicles?*

Ans. Gasoline fuel economy is calculated based on the equation in 40 CFR 600.113-93(e)(1). Diesel fuel economy is calculated based on the equation in 40 CFR 600.113-93(f)(1). CNG fuel economy is calculated based on the equation in 40 CFR 600.113-93(h). Until EPA publishes an LPG fuel economy equation in regulations, manufacturers may use the equation presented in Attachment 1-B.

13. *Where are the EPA guidance letters and Advisory Circular letters located?*

Ans. EPA guidance letters, also called Dear Manufacturer letters, may be viewed on the EPA web site at: http://www.epa.gov/otaq/cert/dearmfr/dearmfr.htm EPA Advisory Circular letters which, in general, preceded the guidance letters, are not available on the EPA web site and must be obtained from EPA by hardcopy or fax. Requests for these letters may be directed to Russ Banush at Banush.Russell@epa.gov

14. *How much do emission tests cost?*

Ans. Cost information concerning emission testing conducted by independent facilities must be obtained directly from that laboratory. EPA does not charge for confirmatory testing if it selects a vehicle to receive such testing. The transportation expense of shipping a vehicle to the EPA Ann Arbor facility must be borne by the alternative fuels converter.

15. *How do I submit data and the application for certification to EPA?*

Ans. The data for alternative fuels converters must be entered in EPA's Certification and Fuel Economy Information System (CFEIS) or by using the attached spreadsheet entry form for aftermarket alternative fuels converters. EPA is offering the use of the spreadsheet for converters as an alternative until a better data base entry system is developed. The spreadsheet test data become part of the manufacturer's application for certification. Completed applications should be sent electronically in pdf format, or by CD in pdf format. Instructions for submitting electronic data to EPA are found in guidance letter CCD-01-24. CD applications should be sent to the attention of Russell Banush of the Certification and Compliance Division, EPA Office Building, 2000 Traverwood Dr., Ann Arbor, MI 48105.

16. *Are there any fuel economy test and reporting requirements such as EPA fuel economy labels and Corporate Average Fuel Economy (CAFÉ) submissions for after-market conversions?*

Ans. EPA fuel economy requirements apply to all new vehicles sold in the US. They do not apply in the case of aftermarket conversions to alternative fueled vehicles. The intent to certify aftermarket conversions systems should be stated in the application for certification.
Cite: 40 CFR Part 600.

17. *What are the required fees for filing an application for Certification?*

Ans. Vehicle conversions are subject to current and future fee schedules. EPA does however, offer a reduced fee to manufacturers when: 1) the vehicles are offered for sale in the U.S. and 2) the full fee exceeds 1% of the projected aggregate retail value added by the conversions.

For the 2002 and 2003 model years, no fees are required if: 1) the aftermarket vehicle is a dedicated gaseous fueled vehicle, or 2) the converter is a small volume manufacturer supplying vehicles which meet clean fuel vehicle ILEV, LEV, ULEV, or ZEV standards. A new fees regulation will be proposed in the near future that will include a new payment table. Information about these changes is posted on the EPA web at www.epa.gov/otaq/fees.htm
Cite: 40 CFR Part 86, Subpart J, and in particular 86.908-93(a)(iii)

18. *When and how do I submit payment?*

Ans. Payment is based on estimated sales for each test group. The fee is made payable to the U.S. Environmental Protection Agency according to the procedure described in EPA guidance letter CD-92-07 and must be submitted with a fees filing form, which is available at: www.epa.gov/otaq/fees.htm Allow approximately two weeks for the EPA to receive the fee and log its payment into our fees database. Proof of payment is based on the payment being received by EPA and its entry into our database. The fees filing form should be included in the application for certification. If applicable, waiver of fees for the 2002 and 2003 MY must be made in writing. Because fees for alternative fuels converters is based on estimated sales, adjustments or refunds of fee payments are available. See 40 CFR Subpart J and CD-92-07 for more detail on EPA's current fee payment requirements.

19. *How do converters request waivers from certain EPA testing requirements?*

Ans. 40 CFR Part 86 Subparts B and S have provisions allowing the waiver of certain test requirements. None of these waivers releases the manufacturer or converter from the

responsibility of complying with the emission standards, however. In general, test waivers are permitted based on an engineering evaluation that all vehicles will comply. Direct any questions on this topic to the attention of Russ Banush, 734-214-4925 or Banush.Russell@epa.gov or Martin Reineman, 734-214-4430 or Reineman.Martin@epa.gov

20. *What underhood emission labels must be added to the vehicle by the alternative fuel converter?*

Ans. The converter must print and affix their label next to the OEM's vehicle emission control information (VECI) label. See 40 CFR 85.505.

21. *How do we obtain public information from the OEM's application for certification?*

Ans. Requests for information, including information on which tests were run to comply with the applicable exhaust, evaporative, and refueling emissions must be submitted under the Freedom of Information Act (FOIA). Direct these inquiries to the Ann Arbor Certification and Compliance Division FOIA officer, Fred Hart, by e-mail or fax to: Hart.Frederick@epa.gov fax: 734-214-4869. CFEIS Summary Sheets contain a complete listing of what tests were conducted, emission levels, deterioration factors, and the standards. The non-confidential information is available after an OEM has received a certificate for the test group in question and the vehicle is in production. The FOIA requires EPA to send information within 20 business days from the time EPA receives a request for information.

22. *What is the statutory emissions "useful life" for aftermarket conversions to alternative fuels?*

Ans. The useful life is linked to the emission standard, and therefore varies with respect to the vehicle class, model year, emission category, and pollutant in question. The useful life for aftermarket conversion purposes does not extend beyond the useful life of the original vehicle. This is because conversions generally rely, at least in part, on emission control equipment already on the original vehicle. Pre-Tier 2 standards are listed at www.epa.gov/otaq/stds-ld.htm Tier 2 standards may be viewed at www.epa.gov/otaq/tr2home.htm

23. *What emission requirements exist for aftermarket conversions that take place beyond the useful life of the original vehicle?*

Ans. The prohibition on tampering continues to apply beyond the useful life of the original vehicle. The response to Question 3 discusses ways to assure you are not tampering, and that response also applies when the conversion occurs beyond the useful life of the original vehicle.

Therefore, an installer of an aftermarket kit is protected from tampering liability if the

installer properly installs a certified conversion kit. However, if the vehicle is beyond the useful life, there is no further in-use liability that the installer must accept, as in-use liability does not extend beyond the useful life of the original vehicle. In addition, if you manufacture or install a non certified kit, you remain subject to potential liability for tampering even if the conversion occurs beyond the useful life of the original vehicle.

24. *What is the emissions warranty period for aftermarket conversions?*

Ans. The emissions warranty starts at the original production date of the vehicle, not the conversion date. For example, a vehicle covered by a 5 year/50,000 mile warranty which is then converted at 4 years/40,000 miles has 1 year/10,000 miles remaining on its emissions warranty.

The emissions warranty period for vehicles is defined as a function of model year. Prior to the 1995 model year the warranty coverage (from the original production date of the vehicle and not the conversion date) is:

> 5 years/50,000 miles, whichever occurs first, except for certain specified diesel components that are warranted for 5 years/100,000 miles.
>
> 2 years/24,000 miles, whichever occurs first, for repairs necessary to correct inspection maintenance (I/M) failures.

For 1995 and later model years the warranty coverage (from the original production date of the vehicle and not the conversion date) is:

> General Emissions Warranty - 2 years/24,000 miles, whichever occurs first, which also includes repairs necessary to correct I/M failures.
>
> Major Emissions Component Warranty - 8 years/80,000 miles, whichever occurs first, which includes the catalytic converter, engine control unit, and on-board diagnostic (OBD) computer if it is different from the engine control unit.

Please note: California's regulations require additional time or mileage warranty requirements for the conversion system manufacturer and/or the system installer.

25. Who is liable for the emissions warranty when a part or system fails on a converted vehicle?

Ans. The vehicle's original manufacturer remains liable for warranty of any systems which retain their original purpose following conversion, except in cases where the failure of such a system is determined to be caused by the conversion. If the failure of such a part or system could be traced to the conversion then the liability would lie with the conversion certifier. For example, a good indication of where the liability lies in such situations would be whether the failure of a part or system is also occurring in non-converted

configurations of the same vehicle. The conversion system manufacturers would be responsible for the emissions warranty for any parts or systems added by the conversion.

26. *Are there any in-use test responsibilities for alternative fuels converters?*

Ans. Responsibilities for conducting in-use testing under current EPA regulations are described in 40 CFR 86.1845-01. There are no in-use test requirements for small volume manufacturers with annual sales of less than 5000 conversions in a given model year.

27. *Do EPA's defect reporting requirements and voluntary recall provisions apply to conversions to alternative fuels?*

Ans. Yes. This process is described in 40 CFR Subpart T, Emission Defect Reporting Process. This Subpart describes emission defect reporting, voluntary emissions recall reporting, and follow-up reporting requirements.

28. *Alternative fuels converters have different time lines for certification than the vehicle OEMs. Alternative fuels conversions also are conducted after the end of an OEM's model year. Can EPA extend the applicable time period of the Certificate?*

Ans. No. The Clean Air Act requires Certificates of Conformity to be issued on a model year basis. Therefore, certificates cover an annual production period and must be obtained each model year. The certificate will expire after December 31st of the year for which it is issued. Data and many sections of the application may be carried over to subsequent years if no changes are made, but new fees are required for each certificate.

29. *What are the OBD requirements for alternative fuels converters?*

Ans. For dual fueled vehicles, the OEM OBD system must remain completely functional when operating on the fuel on which the vehicle was originally certified. Operation on alternative fuels must not falsely register diagnostic trouble codes or illuminate a malfunction indicator light (MIL). Dedicated alternative fueled vehicles and dual fuel conversions operating on the alternative fuel must have functional OBD II systems beginning with 2005 MY light duty vehicle and trucks.

30. *How long does it take to get a Certificate from EPA once a completed application has been submitted to EPA?*

Ans. A manufacturer should plan for at least 30 days for EPA receipt, review, and approval of the application once a complete package is submitted. The application must contain the required sections, all required tests (including any EPA confirmatory tests), correct entry of the test results, proper DFs and meet all standards listed on the Aftermarket Alternative Fuels Converters worksheets.

31. *How do we receive the Certificate for an alternative fuels conversion?*

Ans. Certificates will be faxed to the alternative fuels manufacturer upon request. The original signed certificate is mailed to the certificate holder.

32. *Are there State emission requirements in addition to Federal standards?*

Ans. Yes. The aftermarket conversions must pass any state inspection/maintenance (I/M) test. Current I/M test requirements are summarized on EPA's I/M web site at: www.epa.gov/otaq/epg/state.htm See Question 36 for certification requirements specific to California.

33. *If my vehicle is selected for confirmatory testing at EPA in Ann Arbor, which tests on what fuels will be conducted?*

Ans. The exact tests are a function of the model year of the vehicle. Dedicated alternative fueled vehicles will typically receive an FTP emission test without the evaporative emission test. Dual fueled vehicles will typically receive the FTP with a 2 day evaporative emission test on the alternative fuel. EPA confirmatory tests will be conducted with the gaseous fuels in the vehicle fuel tank supplied by the alternative fuel converter. For dual fuel vehicles, the FTP exhaust, highway NOx, and evaporative emission tests, plus the SFTP if applicable, may be run on the fuel on which the vehicle was originally certified.

The manufacturer is responsible for delivering the vehicle to EPA in a test ready condition. This includes the installation of proper fuel drain fittings for testing dual fueled vehicles on gasoline, fittings and connections to load the gasoline evaporative emission canister for a dual fueled vehicle, and standard tailpipe to constant volume sampler (CVS) connections. Vehicle starting instructions, procedures for draining the gasoline fuel tank, and loading the evaporative emission canister must be included. Failure to provide this information may result in significant delays. A small sample of the alternative fuel may be requested to be delivered to EPA if the vehicle is confirmatory tested in Ann Arbor.

34. *Are there other EPA needs specific to the conversion of aftermarket alternative fueled vehicles which should be included in the application for certification?*

Ans. Given that aftermarket conversions may be performed by individuals or organizations other than the holder of the original certificate, EPA requests that the conversion system manufacturer include in its application for certification a description of the installation procedures and maintenance requirements for the conversion system.

35. *How do heavy duty engine requirements for alternative fuels converters differ from light duty vehicle requirements?*

Ans. Many of the issues discussed above also apply to obtaining a Certificate of Conformity for alternative fuel conversions of heavy duty engines. However, the workshop on

February 13, 2002 focused almost exclusively on vehicle certification, and the references to Subparts B and S of 40 CFR Part 86, and to the above referenced EPA guidance documents, apply to light duty vehicles.

All conversions of heavy duty engines undergo a certification process that is similar to light duty vehicles, however the application process uses a PC-based data entry system. The EPA contact person for engine conversions to alternative fuels is Han Lim. His phone number is: 202-564-9286, and e-mail address is: lim.han@epa.gov

One frequently asked question concerns the acceptability of chassis test data when a heavy duty vehicle or engine is converted to operate on alternative fuels. EPA will only accept engine dynamometer data to obtain a certificate of conformity for aftermarket conversions of heavy duty vehicles or engines. Engine test data are also an accepted means to comply with California's requirements for aftermarket conversions of heavy duty vehicles and engines.

36. *What are the California requirements for aftermarket alternative fuels conversions?*

Ans. California has its own requirements for alternative fuel conversions. For questions regarding new model year OEM vehicles converted to alternative fuels, contact Duc Nguyen at 626-575-6844, or dnguyen@arb.ca.gov For aftermarket conversions, that is, conversion of vehicles which have been sold to the ultimate purchaser and placed in service, please contact Rose Castro at 626-575-6848, or rcastro@arb.ca.gov

Attachment 1-A

Certification and In-use Requirements for Small Volume Manufacturers of Light Duty Vehicle and Light Duty Truck Alternative Fuels Conversions

1. Contact EPA to obtain an information package for small volume manufacturers. Follow instructions shown at www.epa.gov/otaq/cfeis.htm and EPA will assign a unique manufacturer identification number and an abbreviated manufacturer name.

2. Request from EPA the non-confidential sections of the Application for Certification, Part 1, for the manufacturer, model year, and exhaust and evaporative emission test groups through the Freedom of Information Act process. Alternatively, this information may be obtained from other sources, such as working with the OEM vehicle manufacturer.

3. If necessary, contact the OEM directly for any necessary information not available from EPA in the non-confidential portion of the OEM's application for certification. EPA can provide contact numbers for our OEM certification representatives but has no control over how they will assist in finding or distributing their design or calibration information.

4. Prepare all the required information under the requirements of 40 CFR Part 86 Subpart S as it pertains to vehicle conversions to alternative fuels.

5. Submit fee payment and fee filing form to the U.S. Treasury, reference EPA guidance letter CD-92-07, July 7, 1992 and www.epa.gov/otaq/fee.htm.

6. Perform all required emission tests.

7. Submit a test request sheet to EPA and submit a test vehicle to EPA if selected.

8. Enter all data in the EPA data base - CFEIS or spreadsheet.

9. Submit the completed Part 1 Application to EPA, electronically or on CD.

10. Obtain an EPA Certificate for Conformity for the vehicle test group.

11. Build/modify the vehicles. Install a new VECI label.

12. Submit running changes to EPA during the production period as they occur.

13. Submit final Part 1/Part 2 application to EPA at the completion of the model year.

14. Submit defect reports and voluntary emission related recall reports to EPA during the "useful life" of the vehicle as they occur.

15. Provide service and consumer support in response to defect reports and running changes through technical service bulletins and recall notifications.

Attachment 1-B

LPG Fuel Economy Equation

The following fuel economy equation will be used by EPA to calculate fuel economy for vehicles tested on Liquefied Petroleum Gas (LPG) until an equation is added by EPA regulations:

$$MPG_{equiv} = [CWF_{fuel} \times SG_{fuel} \times 3781.8] / [(CWF_{HC} \times HC) + (.429 \times CO) + (.273 \times CO_2)]$$

Where:

MPG_{equiv}	=	Miles per equivalent gallon of liquefied petroleum gas
SG_{fuel}	=	Specific gravity of the fuel
CWF_{fuel}	=	Carbon weight fraction of the fuel
CWF_{HC}	=	Carbon weight fraction of hydrocarbons in the exhaust gas, which is assumed to be equivalent to CWF_{fuel}
HC	=	Hydrocarbons in grams per mile
CO	=	Carbon monoxide in grams per mile
CO_2	=	Carbon dioxide in grams per mile
3781.8	=	Grams of H_2O per gallon conversion factor

$$MPG_{equiv\text{-}gasoline} = 1.377 \times MPG_{equiv}$$

Where:

1.377	=	1 gallon LPG /0 .726 gallons gasoline, ref. 49 CFR Part 538.8

Attachment 2
Test Requirements for Alternative Fuels Converters

August 29, 2002

The test requirements for alternative fueled vehicles are contained in 40 CFR Part 86 and 600. This document provides guidance, but does not supercede the regulations. In an instance where the guidance conflicts with a regulation, the regulation takes precedence.

General: For all MYs, vehicle classes, and standards:

Manufacturers must include test waivers and compliance statements in the application for certification.

Alternative fuel conversions have unique requirements for refueling connections and/or fuel fill disconnection. See 40 CFR 86.1810-10(k)(3). In the September 21,1994 final rule EPA established standards of 1.2 g HC at nozzle disconnect for refueling CNG vehicles, and a design specification of 2.0 cc dead volume space for LPG vehicle refueling nozzles (59 FR 48472 at 48476).

CAFE requirements, fuel economy labeling requirements, and gas guzzler penalties do not apply to aftermarket alternative fuel conversions. CAFE requirements, fuel economy labeling, and possible gas guzzler penalties apply to new alternative fuel vehicles when operated on gasoline or diesel fuel.

I. For LDVs and LDTs meeting Tier 0 or Tier 1 stds:

A Dedicated LPG or CNG:

1) Evaporative tests may be waived if a closed fuel system is used provided assembly procedures and durability data assure there are no leaks and no deterioration. See CFR 600.307-95 and requirements in item 2) below.
2) Refueling test may be waived provided:
   CNG vehicles meet ANSI/AGA NGV1-1994 standards. See 40 CFR 86.1810-01(k)(3).
   LPG vehicles meet outage valve testing requirements of 40 CFR 86.1810-01(n). Manufacturers provide a statement in the application for certification that based on development test or engineering data, vehicles will meet the applicable certification standard.
3) Particulate measurement may be waived. See 40 CFR 86.094-23(c)(1).
4) LDT idle CO test may be waived. See 40 CFR 86.1829-01(b)(5).
5) OBD II required for alternative fuels operation starting in 2005 MY. See 40 CFR 86.1806-01(i). Prior to 2005 MY, OBD II requirements may be waived provided a waiver request is made in the Certification application.
6) Cold CO test not required. See 40 CFR 86.201(a)
7) SFTP not required. See 40 CFR 86.1810-01(h)(i)(4)
8) FTP intermediate and full useful life standards apply.

B Dual fueled gasoline/LPG or gasoline/CNG:

1) If, based on good engineering judgement, the manufacturer does not significantly modify the gasoline emission control system or the fuel control system, and does not increase the test weight by more than 500 pounds, gasoline exhaust and evaporative emission testing is not required. In general, allowable control system modifications which require exhaust and evaporative emission testing on gasoline include any changes which increase emissions. See EPA Advisory Circular 64.

2) If the gasoline fuel supply system or the gasoline refueling or vapor control system is significantly modified, conduct all gasoline exhaust tests (includes SFTP, if applicable, and cold CO), 2 day and 3 day evaporative emission tests with gasoline, and spit back test with gasoline, if applicable, or ORVR tests with gasoline, if applicable.

3) When testing the vehicle with the alternative fuel system, conduct the 2 day and 3 day FTP, refueling disconnect test, and the refueling loss test if applicable. For the 3 day evaporative emission test, the vehicle may be driven on the running loss drive cycle, but the alternative fuel running loss emissions need not be sampled.

Because EPA regulations for alternative fuels allow the use of testing waivers, on a case by case basis converters may obtain waivers for evaporative emission testing. To obtain a waiver from evaporative emission tests, the alternative fuel converter must provide a statement in the application for certification that a closed fuel system has been installed in accordance with current American National Standards Institute/American Gas Association (ANSI/AGA) and National Fire Protection Association standard 58 (NAPA 58) requirements, and that the alternative fuel system is leak free and will not show emissions deterioration for the useful life of the vehicle when the system is properly maintained. In addition, the converter must provide data which demonstrate that dual fuel vehicles when operated on the alternative fuel will purge the canister in a manner similar to that when operated on gasoline. Alternative fuel converters who have EPA approval for evaporative emission test waivers are still responsible for meeting all EPA evaporative and refueling emission requirements, and passing any confirmatory evaporative emission and refueling testing which EPA chooses to conduct.

4) Items 2 - 8 under I A above.

II. <u>For vehicles certified to an NLEV or CFV standard:</u>

A Dedicated LPG or CNG

1) NMOG and HCHO required on FTP.
2) HFET required for highway NOx.
3) Evaporative emission tests may be waived if a closed alternative fuel system is used. See restrictions under II A 1 and 2 above.
4) Particulate measurement applies to diesels only.
5) Items 2 - 8 under I A, above.

B Dual fueled gasoline/LPG or gasoline/CNG

1) NMOG and HCHO required on FTP with alt fuel.
2) HFET with alt fuel required for highway NOx.
3) Items 1 - 4 under I B, above.

III. For vehicles certified under Tier 2 standards:

1) Interim non-Tier 2 standards apply to small volume manufacturers beginning in 2004 MY.

2) Tier 2 standards apply to small volume manufacturers beginning in 2007 MY for LDV/LLDT vehicles, and for HLDT/MDPVs beginning in 2009 MY. See 65 FR6698, Feb 10, 2000.

IV. For new heavy-duty vehicle chassis dynamometer standards:

1) Applies to small volume manufacturers beginning in 2007 MY. See 65 FR 59896, Oct 6, 2000.